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South African Helminths.—Part III.

Some Mammalian and Avian Cestodes.

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Fam. DAVAINEIDAE Fuhrmann, 1907.

Sub-fam. DAVAINEINAE Braun, 1900.

Raillietina (Skrjabinia) deweti sp. nov.

The available examples of this species consisted of one entire specimen and the scolex and fragments of another specimen; these were collected by Mr. de Wet, veterinary student at this institute, and placed at the writer's disposal for determination.

The entire specimen is 48 mm. long with a maximum breadth of 0·98 mm. It is built up of 31 segments plus a scolex and short neck; all the segments, except the few anteriormost, are much longer than broad, and the posteriormost segments have a superficial resemblance to the ripe segments of *Joyeuxia fuhrmanni* from carnivores.

The scolex has a diameter of 0·174 mm. and carries four oval suckers, 0·15 mm. long by 0·13 mm. across; the suckers carry no hooklets, but whether this is normal or whether they have been lost, it is not possible to say. The rostellum carries a double row of about 200 typical hammer-shaped hooks, each having a length of 0·014 mm. The neck is about 0·4 mm. long and in the complete specimen the first segment is broader than long, measuring 0·19 mm. by 0·07 mm.; in the incomplete specimen the first segment is longer than broad, measuring 0·2 mm. long by 0·15 mm. broad. In the complete specimen segments 19 to 22 are mature and segments 29, 30 and 31 are gravid. The largest mature segment is 2·1 mm. long by 0·58 mm. broad and the posteriormost gravid segment is 4·4 mm. long by 0·62 mm. broad.

The ventral excretory canals are well developed and may attain a diameter of 0·05 to 0·07 mm.

The genital atria alternate irregularly and are situated just anterior of the middle of the segment, their position roughly dividing the segment into the ratio of 4:5. The pore leads into a small genital atrium at the base of which open the male and female ducts. The cirrus sac is large and muscular and extends obliquely inwards and forwards, crossing the excretory canals, and almost reaches the midline of the segment (Fig. 1 and 2); it has a fusiform shape and

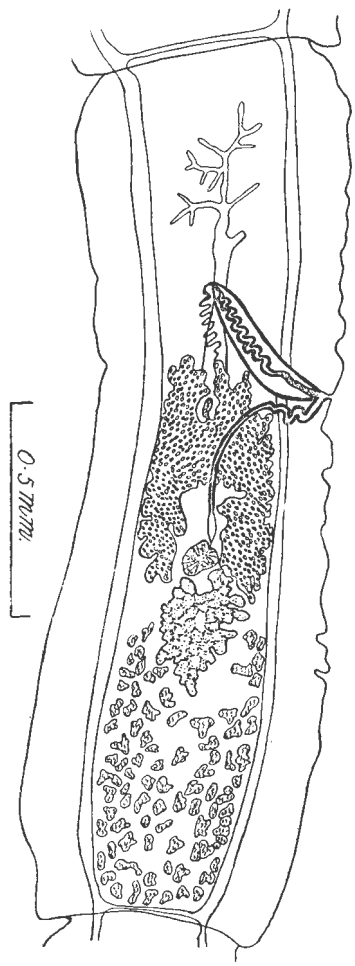


Fig. 1.—*Raillietina (Skrj.) dewcti* sp. nov. Mature segment.

in mature segments reaches a length of 0·32 mm. by 0·052 broad; a few weak retractor muscles are attached to its base. The cirrus is well developed, about 0·2 mm. long and 0·015 mm. thick and is densely covered with minute spines; it leads into a somewhat thick-walled and convoluted vesicula seminalis interna which on emerging from the cirrus sac passes backwards and becomes much coiled; the coils are surrounded by darkly staining cells which possibly are prostatic in nature. The testes, of which there are 80 to 100, are all

situated in the posterior third of the segment behind the ovary; the anteriormost testes, however, extend lateral of the yolk gland; they are irregularly shaped, but whether this is their normal shape or due to contraction is not certain.

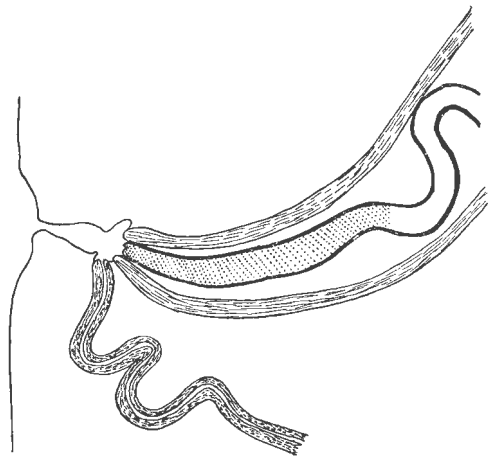


Fig. 2.—*Raillietina* (*Skrj.*) *deweti* sp. nov. Terminal portions of cirrus pouch and vagina.

The female genital glands occupy the middle third of the segment. The ovary is in the shape of an inverted U and consists of many lobules; it occupies the whole space between the excretory canals; it is about 0·5 mm. long by 0·3 mm. broad; between the tips of the U there is a small somewhat globular shell gland having a diameter of about 0·07 mm. The yolk gland is large, somewhat heart shaped and is situated immediately behind the ovary; it is almost 0·3 mm. long with a maximum breadth of 0·2 mm. The vagina is thick walled and opens into the genital atrium on the same level but behind the opening of the cirrus pouch; it is thrown into several loops until it passes over the excretory canal, after which it passes in a curve posteriorwards between the two ovarian limbs; its posterior end is slightly dilated to form a spindle-shaped reseptaculum seminis after which it joins the shell gland. The uterus makes its appearance in the mature segments as a median canal extending forwards from the level of the ovary; it gives off numerous irregular side branches; when the genital glands begin to disappear it also extends posteriorwards also giving off numerous lateral branches; these eventually fill the whole proglottid between the excretory canals, and in it the numerous small eggs are lodged. In the ripe segments the uterus disappears and the eggs are seen to lie singly filling the whole inter-excretory canals area and not aggregated into clumps to form egg capsules. The eggs are small and rounded and only measure 0·014 to 0·015 mm. in diameter; in no case were any embryonic hooks made out.

Affinities.—The hammer-shaped rostellar hooks, irregularly alternating genital pores and the absence of egg-capsules containing several eggs places this species in the subgenus *Skrjabinia* Fuhrmann, 1920. According to Fuhrmann (1932) seven species of this subgenus

have been described from galliform birds, and, except for *R.* (*S.*) *bolivari* (Lopez-Neyra, 1929) the writer has been able to obtain some data concerning their morphology. The species *R.* (*S.*) *cesticillus* (Molin, 1858), *R.* (*S.*) *maroteli* (Neveu-Lemaire, 1912) and *R.* (*S.*) *ransomi* (Williams, 1931) differ from the writer's species in their greater number of rostellar hooks (ca. 500) and in their much smaller cirrus pouches and smaller number of testes. *R.* (*S.*) *circumvallata* (Krabbe, 1869) and *R.* (*S.*) *polyuterina* (Fuhrmann, 1908) have ca. 200 hooks, 0·016 mm. long, but can be separated from the writer's species by their smaller number of testes (20 and 40 respectively) and much smaller cirrus pouches; the small cirrus pouch also distinguishes *R.* (*S.*) *retusa* (Clerc, 1903) from the above described species. The elongated nature of the segments, the disposition of the genital glands and the large size of the cirrus pouch seem to ally the writer's species with *R.* (*S.*) *bovini* (Megnin, 1899) from columbiform birds, but these two species can be easily separated in that the latter species has only 120 rostellar hooks, the ovaries are smaller and not U-shaped and the testes are only about 30 in number.

Specific diagnosis.—Davaineinae provided with ca. 200 rostellar hooks, 0·014 mm. long; genital pores irregularly alternating; majority of segments much longer than broad; about 100 testes in posterior third of segment behind ovary; cirrus sac large, almost reaching mid-line of segment; ovary an inverted U, large and much lobulated; yolk gland behind ovary, large and somewhat heart-shaped; vagina thick-walled and distal portion convoluted; uterus arises as a median stem with numerous side branches. Eggs single and not forming egg capsules containing several eggs.

Host: *Numida* sp.

Location: Small Intestine.

Locality: Lady Grey, Cape Province.

Type in the Onderstepoort Helminthological collection.

Sub-fam. Idiogeninae Fuhrmann 1907.

*Schistometra korhaani** sp .nov.

This species is represented by two mature specimens collected from a white-quilled Korhaan, Orange Free State, and two immature specimens from a Grey Korhaan, Transvaal. Only one of the mature specimens contained a head which, for some reason unknown, had been twisted ventralwards and flattened *en face;* however, the hooks were still present.

The specimens are a dirty brownish grey and do not show a yellowish colour in their end segments as described for other members of this genus. The largest specimen is 70 mm. long, and has a maximum breadth of 2·6 mm. behind its middle, and a thickness of 1·6 mm.; the other mature specimen was sectioned, transversely

* "Korhaan" is the Afrikaans name for a Bustard.

and horizontally; it was 63 mm. long, and had a maximum breadth of 2·8 mm. and a thickness of 1·9 mm. the flattened scolex is 0·85 mm. by 0·75 mm. across; the two scolices from the immature specimens are quadrangular and seen from the front have a latero-lateral width of 0·4 and 0·46 mm. and a dorso-ventral width of 0·37 and 0·4 mm. respectively. The rostellum was in all cases retracted; it is flattened dorso-ventrally and in the unflattened heads it was 0·28 mm. broad by 0·15 mm. high; it is armed by numerous small hammer-shaped hooks arranged in two rows (Fig. 3); these

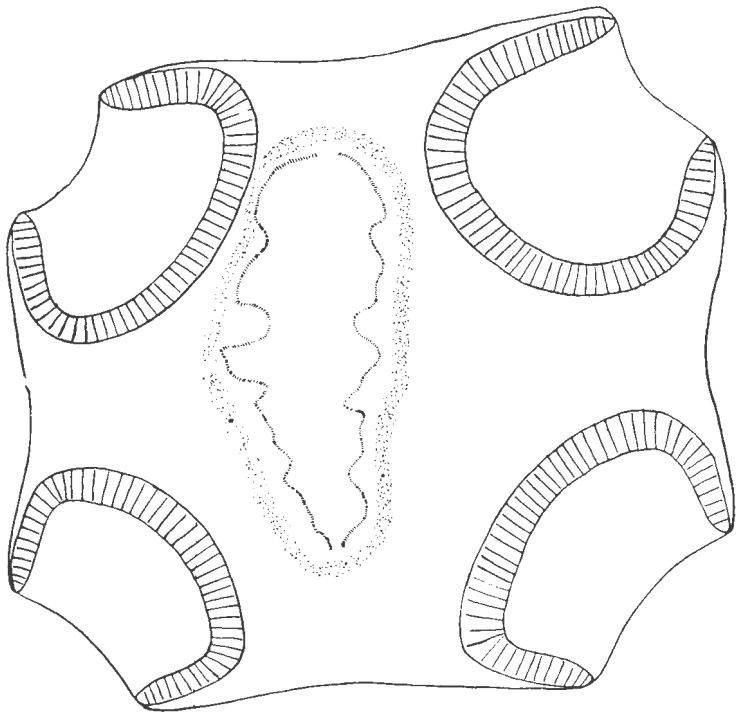


Fig. 3.—*Schistometra korhaani* sp. nov. Front view of scolex showing arrangement of hooks.

rows are arranged in an irregular zig-zag and do not meet laterally, i.e. the dorsal and ventral rows of hooks are separated from each other by a break; two heads, which apparently still retained all their hooks, carried respectively just over 700 and 800 hooks each. These hooks are 0·010 mm. long. The four suckers occupy the four corners of the head; each is provided with two lateral appendages as described for the genus *Octopetalum;* they are unarmed and in the unpressed heads have a diameter of 0·17 mm. and a depth of 0·12 mm.

Round the base of the rostellum there are numerous small hooks, having the shape of a fish-hook. They are 0·003 mm. long with a hook about 0·001 mm. long.

In transverse section it is noted that the longitudinal musculature is very strongly developed (Fig. 4); it forms a layer about 0·3 mm. thick surrounding the parenchyma, this layer being built up of numerous columns of muscle bundles, each column composed of 5 to 7 bundles; the outermost bundles are the smallest, being

composed of 1 to 3 fibres each, but passing inwards the bundles become larger and the innermost bundles may each be built up of as many as 80 fibres, each 0·003 to 0·008 mm. in diameter. On the outer and inner margin of this muscle layer there is a thin layer of circular muscles, and the outer surface is bounded by a cuticle reaching 0·013 mm. in thickness. The dorso-ventral musculature is very poorly developed and consists of only a few isolated fibres.

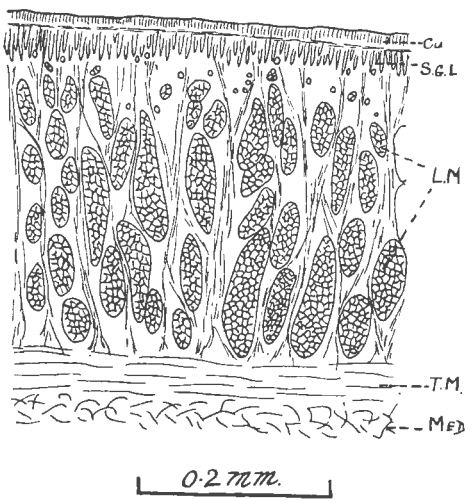


Fig. 4.—*Schistometra korhaani* sp. nov. Transverse section of cortex (Cu = cuticle; S.G.L. = subcuticular glandular cells; L.M. = longtitudinal muscle bundles; T.M. = transverse muscles; Med. = medulla).

The ventral excretory vessel is large and thin-walled and runs more or less straight; in mature segments it has a diameter of 0·13 to 0·17 mm.; and at the posterior end of each segment a valve projects into its lumen as figured for *Schistometra conoides;* the dorsal excretory vessel is much smaller, having a diameter of at most 0·018 mm.; it runs a somewhat zig-zag course, has a thicker wall and is surrounded by darkly staining cells. The nerve cord is quite distinct and lies just lateral of the ventral excretory canal and has a thickness of 0·025 to 0·03 mm.

Except for the posterior segments, the segments are all very much broader than long; the posterior edge of each segment is extended backwards to form a collar covering about half of the segment behind. The genital atria are practically unilateral but a few contiguous atria are present on the opposite side; they are situated in the anterior half of the segment; the genital ducts have a peculiar course in that they pass between the excretory canals and dorsal of the nerve cord or dorsal of the excretory canals and nerve.

The cirrus pouch is muscular and oblong and does not reach the excretory canals; it is from 0·2 to 0·3 mm. long by 0·04 to 0·045 mm. thick; the cirrus is delicate and appears to carry minute spines. The vas deferens is coiled inside the cirrus pouch and after crossing the excretory canals it becomes densely coiled and is surrounded by deeply staining prostatic cells. There appear to be from 40 to 60 testes, 0·035 by 0·023 mm. to 0·042 by 0·015 mm. size,

and confined to the posterior half of the segment; they occupy a vertical plane, two to three testes deep, behind the ovary, and the plane may be one to three testes broad; they do not extend beyond the excretory canals, and in a horizontal section 12 to 20 testes may be seen in a single section of a segment.

The vaginal aperture is situated on the same level but behind the opening of the cirrus pouch; both open into a deep genital sinus about 0·1 mm. deep. The ovary is slightly poral in position and consists of two lobes; the shell gland lies between these two lobes but dorsal, and the yolk gland lies posterior of the aporal ovarian lobe. The uterus makes its first appearance as a transverse structure in front of the testes; its growth is more rapid laterally, less so dorso-ventrally and least anteriorly; it extends laterally to the excretory canals and anteriorly to about the middle of the segment; irregular antero-posterior septa portion off its lumen into a number of compartments.

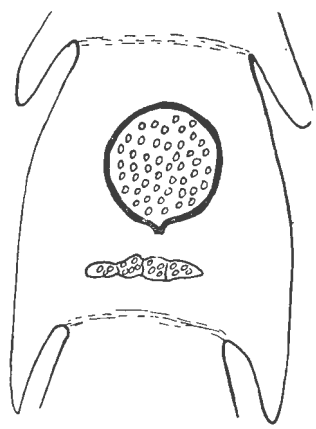


Fig. 5.—*Schistometra korhaani* sp. nov. Horizontal section of ripe segment showing paruterine organ.

The paruterine organ arises as a streak of deeply staining cells along the anterior margin of the segment; it grows posteriorly but its centre grows quicker than its sides. This thickened central plug grows and presses on the anterior face of the uterus and eventually by further growth forces the anterior wall of the uterus back on to its posterior wall; in this way in older segments there are apparently two separate uteri, one on either side of the paruterine organ, but careful examination will show that these two sacs are joined to each other by the adjacent anterior and posterior uterine walls. With the continued growth of the paruterine organ the segments become longer and may eventually become 1·4 mm. long by 1·1 mm. broad and 1·2 mm. thick; in these segments the adjacent uterine walls, behind the paruterine organ, again become separated and the organ itself becomes globular and hollow (Fig. 5); just before the segments become liberated an opening is formed on the posterior face of the paruterine organ and through a rupture in the uterus the eggs pass singly from the uterus into the organ. The eggs almost fill the organ, the rest of the organ being filled by a structureless cement-like material. In fully mature segments the paruterine organ reaches a length of

0·52 mm. by 0·435 mm. across. The eggs are provided with three coats, the 2nd forming the egg shell; they are rounded 0·037 to 0·04 mm. in diameter with an embryo measuring 0·032 mm.

Affinities.—The type of rostellar hooks and the presence of a paruterine organ places this species in the sub-family Idiogeninae Fuhrmann, 1907. The well developed longitudinal muscles, the disposition of the testes in a vertical plane behind the female glands, the presence of appendages on the suckers, and the presence of values in the excretory system places it in the genus *Schistometra* Cholodkovsky, 1912. Three species of cestodes have been assigned to this genus, namely *S. conoideis* (Bloch, 1702), *S. macqueeni* (Woodland, 1930) and *S. wettsteini* Weithofer, 1916, all of which occur in otidiform birds. A description of the last named species is unfortunately not available.

From Skrjabin's (1914) redescription of *S. togata* Cholod., 1912 [=*S. conoideis* (Bloch)] it is apparent that this species differs from the wrier's material in the number and arrangement of the rostellar hooks and in the irregularly alternating arrangement of the genital pores. In *S. macqueeni* the rostellar hooks are arranged in a single row, the genital pores irregularly alternate and the uterus breaks up into capsules containing several eggs.

Specific diagnosis.—Idiogeninae with thickened strobila, and well developed longitudinal muscles and segments, except the last few, much broader than long. Scolex with four unarmed suckers each carrying a pair of appendages, and rostellum with numerous (700-800) hooks arranged in a double zig-zag row not meeting laterally; numerous minute hooklets covering base of rostellum. Genital pores mostly unilateral. Genital ducts pass between or dorsal of excretory canals; 40-60 testes in a vertical plane in posterior half of segment; ovary two lobed, slightly poral in position and anterior to testes; uterus transverse and divided by septa into a number of compartments. Paruterine organ globular and receives eggs prior to being detached.

Host: Afrotis afroides afroides (A. Smith) and *Eupodotis barrowi* (Gray).

Location: Small intestine.

Locality: Orange Free State and Transvaal.

Types in the Onderstepoort Helminthological collection.

Fam. Anoplocephalidae Fuhrmann, 1907.

Sub-fam. Linstowinae Fuhrmann, 1907.

Inermicapsifer leporis sp. nov.

About 50 specimens of this small cestode were recovered from the small intestine of a vlakhaas—*Lepus capensis vernayi* Roberts, shot at Fauresmith, O.F.S. The specimens were well extended and were studied both in section and as *toto* mounts.

The length varies from 15 to 25 mm. with a maximum breadth towards the posterior end of 1·01 to 1·07 mm.; the scolex is fairly large and squarish and has a cross diameter of 0·59 to 0·64 mm.; the suckers are rounded, prominent and have a diameter of 0·23 to 0·28 mm. The head is followed by a short neck 0·23 to 0·3 mm. long by 0·34 to 0·41 mm. wide. The segments, of which there are 75 to 90, are at first very much wider than long; as they reach maturity, however, the length increases so that in mature segments they are only slightly more than twice as broad as long; (0·73 by 0·3 mm.) further back the relations change so that when ripe the segments are actually longer than broad (0·73 to 0·82 mm. broad by 0·84 to 0·9 mm. long).

The genital rudiments make their appearance very soon after the demarcation of the youngest segments; the first to appear are the rudiments of the female glands and the vagina and cirrus; about 15 segments further back the testes appear and from about the 35th to 40th segment the segments became mature. Only the last half dozen segments can be considered as ripe. The genital pores are all unilateral and situated at the centre of the lateral margin; in ripe segments, however, they may occupy a slightly more posterior position. The genital ducts all pass dorsal of the nerve and ventral excretory canal.

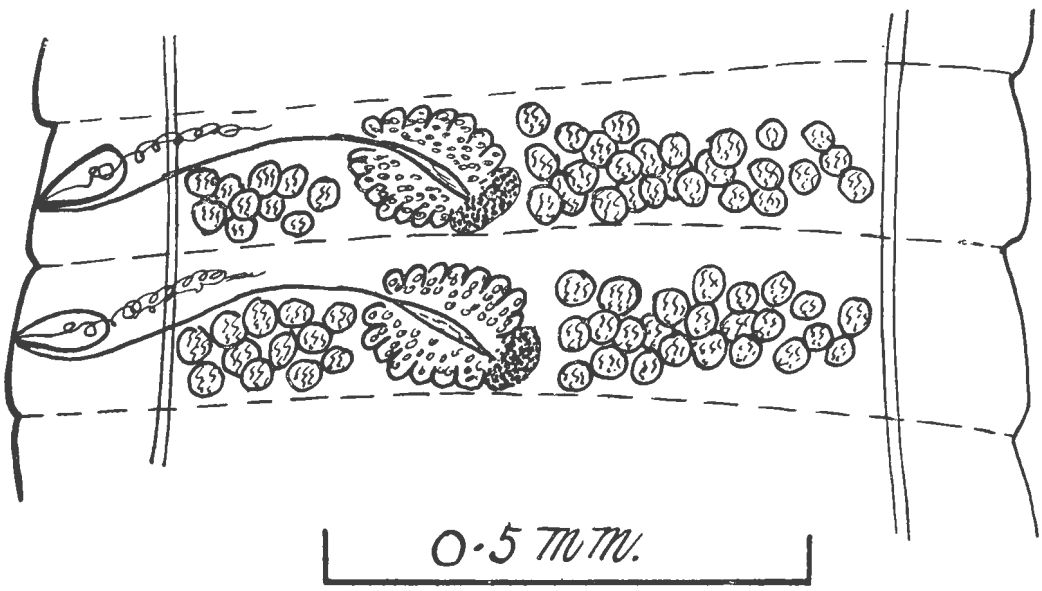


Fig. 6.—*Inermicapsifer leporis* sp. nov. Mature segment.

The testes (Fig. 6) of which there are from 35 to 40 in each segment, are, when mature, hollow oval bags having their germinal cells aggregated towards one side and the rest of the bag filled with sperms; they measure from 0·05 to 0·065 mm. by 0·04 by 0·48 mm. When they make their first appearance they are arranged in two groups separated by the female gland rudiments; as they reach maturity they enlarge and may pass posterior of the ovarian rudiments thus forming a continuous layer lateral and posterior of

the ovary. However, this state only lasts through a few segments because, as the ovary matures and enlarges, it pushes the testes apart so that there is again a poral and an aporal group. The poral group consists of from 10 to 13 testes, the remainder being aporal; they reach but do not pass over the excretory canals, neither are they found anterior of the female glands; they form a layer one to two testes deep. The cirrus sac is muscular and oval 0·11 to 0·15 mm. long with a maximum diameter in its inner third of 0·05 mm.; it may reach but does not cross the excretory canals. The cirrus is very weak and unarmed; a small vesicular seminalis interna is present. After crossing the excretory canal the vas deferens widens, is filled with sperms and is thrown into several dorso-ventral loops.

The vagina opens to the exterior posterior and ventral of the cirrus sac; it is muscular, has its lumen lined by delicate cilia, and extends to the excretory canal. Beyond the excretory canal it loses its muscular nature and enlarges to form a thin-walled and slightly convoluted receptaculum seminis. The ovary is a multilobulate organ, slightly poral in position, and has its lobes limited to its lateral and posterior margins; it is about 0·16 mm. long by 0·17 mm. broad. The yolk gland is somewhat oval, 0·09 mm. broad by 0·07 mm. long and is situated posterior and ventral of the ovary, slightly towards its aporal margin. The uterus arises as a transverse tube, but it very soon breaks up to form 40 to 50 egg capsules each containing 3 to 10 eggs; these eventually occupy the whole of the segment and even extend lateral of the excretory canals.

The cuticle is 0·004 to 0·006 mm. thick; internal to it and extending through the whole thickness of the cortical parenchyma there are numerous irregularly scattered longitudinal muscle fibres, not arranged in any definite layer. Vertical and transverse muscles are also well represented by irregularly scattered figres.

The excretory system is represented by the usual two longitudinal canals, which, however, are situated on the same level; the ventral excretory canal is from 0·21 to 0·29 mm. from the edge of the segment in mature and ripe segments, and has a diameter of about 0·02 mm.; the dorsal excretory canal is found about midway between the ventral canal and the edge of the segment; it is very small and has a diameter of only about 0·006 mm.

Affinities.—The above species forms a transition between the group *settii* and the group *hyracis* in that the two groups of testes are not so widely separated as in the former group, and also because prior to the maturation of the ovary the testes meet posterior of the ovary as is seen in the latter group. However, this latter condition is only transitory, and consequently the above described species can be referred to the *settii* group.

Of the twelve species of this genus which have been rescribed from mammals, there is only one, *I. settii* Janicki, 1910 from *Procavia capensis*, in which the testes are arranged in two groups.

The writer's specimens differ from Janicki's species in that the two groups of testes are not so distinctly separated, the number of testes is smaller, there are more egg capsules per segment and the genital pores are situated in the centre of the lateral margin.

Specific diagnosis.—Linstowinae up to 25 mm. long characterised by having 36 to 40 testes arranged in a poral group of 10 to 13 testes and the remainder situated aporally; no testes anterior of the ovary, and prior to maturity of ovary a few testes may be posterior of the ovary. Ovary slightly poral in position; receptaculum seminis present; 40 to 50 egg capsules to each segment, these extending laterally over the excretory canals.

Host: *Lepsus capensis vernayi* Roberts.

Situation: Small intestine.

Locality: Fauresmith, Orange Free State.

Types in the Helminthological Collection, Onderstepoort.

Fam. Dilepididae Fuhrmann, 1907.

Sub-fam. Dilepidinae Fuhrmann, 1907.

Catenotaenia geosciuri sp. nov.

This species is represented by one worm 93 mm. long and the scolex and fragments of what probably represents a second specimen. Entire specimens are probably considerably longer than the longest worm present, because in this worm the hindmost segment was only about half the length of detached segments, and neither did it contain any eggs. The largest worm was mounted *in toto* and from it, except where otherwise stated, the following details were observed. The worm consists of 37 segments which progressively increase in length posteriorly. The anteriormost segment is slightly broader than long (0·278 mm. by 0·19 mm.) and so is the second (0·282 mm. by 0·232 mm.); the third is longer than broad (4·27 mm. by 1·24 mm.); the last segment is the largest measuring 7·3 mm. long by 1·45 mm. broad in its middle; detached segments were much longer, the largest measuring nearly 15 mm. long by 1·6 mm. broad. These elongated segments give the strobila a superficial appearance very similar to that seen in members of the genus *Dipylidium*.

The head is relatively small and carries four somewhat rounded and small suckers; in the mounted specimen the head measured 0·27 mm. across and the suckers had a diameter of 0·087 mm.; the unmounted head measured 0·348 mm. across and the suckers had a diameter of 0·128 mm. In both scolices a rostellum and hooks were absent. The neck is elongate and is slightly thinner than the scolex; it measured 1·3 mm. long and 0·236 mm. across in the mounted and 1·6 mm. long and 0·29 to 0·365 mm. across in the unmounted specimen.

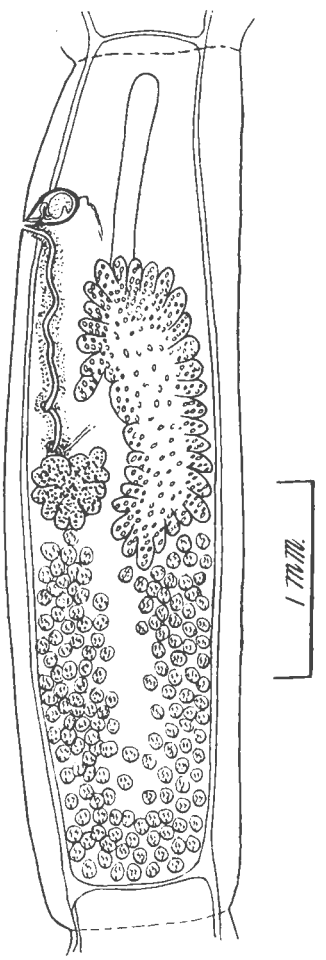
The longitudinal muscles are fairly well developed and in cross section are seen to be arranged in a single layer surrounding the medulla; it consists mostly of isolated muscle fibres, but in some places there appears to be a tendency for 4 to 7 fibres to be aggregated together to form bundles. Circular and dorso-ventral muscles appear to be poorly developed.

The excretory system consists of two longitudinal canals passing down the length of the strobila; these do not form a complicated network as described for *C. lobata* Baer and *C. symmetrica* Baylis. The ventral canals are large and increase in diameter posteriorwards; in section they have a diameter of 0·03 to 0·04 mm. in mature segments and 0·072 to 0·09 mm. in ripe segments; these canals are joined to each other by a transverse canal at the posterior end of each segment. The dorsal canals are small, have a diameter of 0·009 to 0·014 mm. and are situated dorso-lateral of the ventral canals. The nerve cord lies just lateral of the ventral canals. The genital ducts pass dorsal of the ventral canal and nerve cord.

The genital pores alternate irregularly and are situated far forwards at about the junction of the 1st and 2nd fifths of the segment. The cirrus sac is somewhat pearshaped and is from 0·2 to 0·25 mm. long with a diameter of 0·11 to 0·13 mm. (Fig. 7); it crosses the excretory canals. The cirrus is weakly muscular, is unarmed, has its lumen lined by cuticle and is from 0·04 to 0·045 mm. thick. A vesicula seminalis interna is present. The testes are numerous and are all situated in the posterior half of the segment behind the female glands; there appear to be about 200 testes from 0·064 to 0·087 mm. in diameter.

A striking characteristic of this species is the excessive development and position of its vagina; it opens into the genital pore just posterior of the opening of the cirrus sac; it passes transversely inwards until it crosses the excretory canals after which it passes backwards, more or less parallel to the ventral canal and is thrown into a few loops during its course. It is thick walled and has a diameter of about 0·075 mm. to 0·085 mm.; its lumen has a cuticular lining; it is surrounded by darkly staining prostatic cells, and is about 1·3 to 1·5 mm. long. Its posterior extremity widens out to form a globular receptaculum seminis, situated just in front of the yolk glands; the receptaculum seminis is small and inconspicuous in mature segments but after the dissolution of the ovary and yolk glands it increases in size and may attain a diameter of 0·23 to 0·29 mm. The female glands are confined to the anterior half of the segment; the ovary is large and multilobed and occupies an aporal position; it has a maximum length of 1·46 mm. by 0·73 mm. broad, and extends slightly posterior of the yolk gland. The yolk gland is porally situated towards the posterior end of the ovary; it is multilobed somewhat rounded organ attaining a length of 0·427 mm. by 0·45 mm. broad. The uterus first makes its appearance in mature segments as a centrally placed hollow tube extending forwards anterior of the ovary; in older segments a similar tube passes backwards towards the posterior end, and when the sexual glands begin to disappear sacculations or lateral branches are formed on either side of this central tube; in ripe segments these lateral sacculations number about 40 on either side and the majority show secondary indentations (Fig. 8). Numerous eggs are present; the outer membranous envelope has diameter of 0·023 to 0·025 mm.; the inner cuticular shell is oval, 0·015 to 0·0175 mm. long by 0·11 mm. broad, and the embryo fills its lumen. The six hexacanth hooks are small and only measure 0·005 to 0·006 mm. in length.

Affinities.—The absence of an excretory network allies this species to *C. pusilla* (Goeze, 1782) and *C. dendritica* (Goeze, 1872) and distinguishes it from the two species *C. lobata* Baer, 1925 and *C. symmetrica* Baylis, 1927. It has about the same number of testes as in *C. dendritica* (approximately 200 to 250) but many more than



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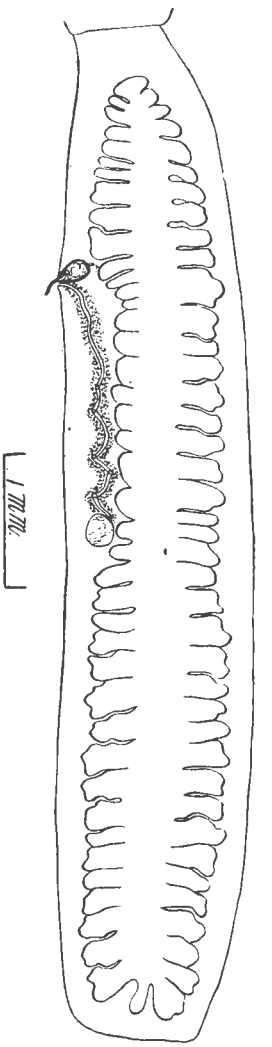


Fig. 8.

Fig. 7.—*Catenotaenia geosciuri* sp. nov. Mature segment.
Fig. 8.—*Catenotaenia geosciuri* sp. nov. Ripe segment showing uterus.

in *C. pusilla* (approximately 70). The writer's species, however, may be differentiated from *C. dendritica* by the nature and position of its vagina, the more anterior position of the genital pores and by its greater number of lateral uterine branches. The writer has not been able to compare his species with *C. rhombomidis* Schulz and Landa, 1934, these authors' description not being available in South Africa.

Specific diagnosis.—Dilepidinae without hooks or rostellum; strobila probably considerably longer than 93 mm.; segments, except for the first few, all longer than broad; posterior segments may be

15 mm. long; excretory system of small dorsal and large ventral canals, latter joined to each other by transverse canal at posterior end of segment; excretory network of canals absent. Genital pores alternate irregularly and are situated far forwards; cirrus sac pear-shaped, crosses excretory canal and contains an unarmed cirrus and vesicula seminalis interna; testes about 200 in number and situated behind female glands in posterior half of segment. vagina long, muscular, surrounded by darkly staining prostatic cells and passes backwards more or less parallel to lateral margin of segments; ovary large, multilobate and aporal; yolk gland somewhat rounded and lobate, situated porally at side of posterior extremity of ovary; reseptaculum seminis present; uterus a median stem with about 40 sacculations on either side; eggs numerous, outer envelope 0·023 to 0·025 mm. diameter and inner egg shell 0·015 to 0·0175 mm. diameter.

Host: *Geosciuris capensis capensis* (Kerr.)

Location: Small intestine.

Locality: Lady Grey, Cape Province.

Types in the Onderstepoort Helminthological Collection.

Onderstepoortia taeniaeformis gen. & sp. nov.

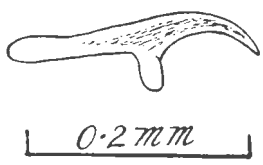
Four specimens of this species were obtained from a single stone curlew shot in the grounds of this institute; besides this species the intestine contained more than a hundred specimens of a cestode which the writer thinks is identical with *Paricterotaenia delachauxi* (Baer, 1925).

The maximum length is 41 mm.; the longest specimen has 65 segments and in it the genitalia make their appearance in the 40th segment; the 53rd to 60th segment are mature and the last segment has lost all its genitalia but no uterus or eggs are present. A specimen 38 mm. long has 76 segments and the genitalia appear in the 45th segment; segments 59 to 67 are mature and the last segment contains eggs. The maximum breadth is 2 mm. and the segments are all broader than long except the posteriormost where they may reach a length of about 3 mm. by 1·9 mm. broad.

The scolex is large and reaches 1·1 mm. across; the four suckers are rounded, have a diameter of about 0·28 mm. and are tilted slightly forwards. The rostellum is massive up to 0·34 mm. diameter and carries a single circlet of 30 to 32 taenoid hooks 0·22 to 0·228 mm. long from the tip of the blade to the tip of the handle (Fig. 9); the blade and the handle are more or less in a straight line and the guard forms almost a right angle with this line. The hooks vary slightly in size, alternate hooks having slightly shorter and narrower handles than those adjacent.

The neck is short and is only 0·3 to 0·39 mm. long with a maximum breadth of 0·6 mm.; mature segments are from 1·1 to 1·5 mm. long by 1·8 to 2 mm. broad; the posteriormost segment may reach a length of 3mm. by 1·9 mm. broad.

In transverse sections of mature segments the following anatomical details are observed (Fig. 10); the cuticle has a thickness of 0·007 mm. and this is followed by a very thin layer of transverse muscle fibres; the subcuticular glandular cells form a layer about 0·04 mm. thick and consists of large club-shaped cells; the longitudinal muscles in the cortex form a layer about 0·14 mm. thick and consists of large bundles of muscle fibres, the bundles being



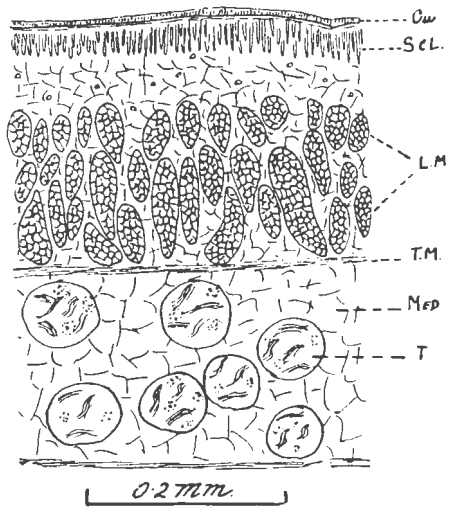


Fig. 9.—*Onderstepoortia taeniaeformis* gen. & sp. nv. Rostellar hook.

Fig. 10.—*Onderstepoortia taeniaeformis* gen. & sp. nov. Transverse section of medulla and cortex. (T = testis; other lettering as in Fig. 5.)

generally 3 deep; the outer bundles are smaller and consist of 15 to 20 fibres each whereas the inner bundles are larger and consist of 40 to 50 fibres each; each fibre may attain a diameter up to 0·009 mm.; the parenchyma between this layer and the glandular cells is from 0·042 to 0·049 mm. thick and contains very few isolated fibres; more isolated fibres are however present in this region towards the ends of the segment. The inner transverse muscles form a layer only 0·012 to 0·014 mm. thick. The central and dorsal excretory vessels are relatively large, the formar having a diameter of 0·026 to 0·032 mm. and the latter of 0·01 to 0·012 mm.; the formar is situated 0·29 to 0·38 mm. from the edge of the segment. The nerve cords lie just outside the ventral excretory canals, are more or less rounded and have a diameter of 0·058 to 0·073 mm. The genital ducts pass between the excretory canals and dorsal of the nerve.

The genital atria are small and inconspicuous, alternate irregularly and are situated in the anterior half of the segment at about the junction of the first and second thirds. The cirrus sac is muscular and club shaped and crosses the excretory canals (Fig. 11); it is from 0·278 to 0·29 mm. long with a maximum thickness of 0·052 mm.; the vas deferens forms only a few coils inside the cirrus sac but after emerging it forms a dense mass of coils. The testes fill up the whole segment not occupied by the female glands and male and female

genital ducts; they number from 120 to 150 and are limited laterally by the excretory canals, and occur throughout the thickness of the medulla forming a layer two to three testes deep; they are rounded and large and have a diameter of 0·067 to 0·073 mm. A vesicula seminalis interna and externa are absent.

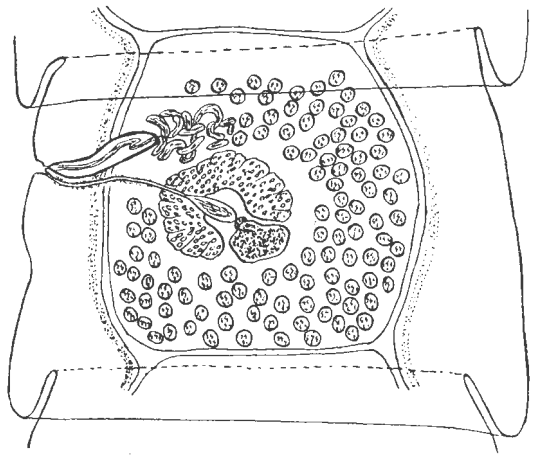


Fig. 11.—*Onderstepoortia taeniaeformis* gen. & sp. nov. Mature segment.

The vagina opens into the genital atrium just behind the cirrus sac; it is muscular and is surrounded by darkly staining cells; its inner end is expanded to form a large and oval receptaculum seminis which may reach a length of 0·232 mm. by 0·104 mm. across. The ovary is a crescentic multilobed organ, slightly poral in position; the yolk gland is large and lies posterior-lateral of the ovary forming a kind of plug to this organ. The shell gland is very small and is partially embedded in the dorsal portion of the yolk gland. The uterus appears to be very transitory because no signs of it were seen prior to the appearance of the eggs; in sections of egg containing segments the uterus has broken up into a number of small chambers, each of which contains a single egg. The eggs fill up the whole segment between the excretory canals; they are rounded and thin shelled and have a diameter of about 0·058 mm.; the onchosphere is up to 0·045 mm. large and its hooks are 0·026 mm. long.

Affinities.—The presence of an armed rostellum with taenoid hooks and a uterus which breaks up to form egg capsules places this species in the sub-family Dipylidiinae (Stiles, 1896) of the family Dilipidae Fuhrmann, 1907. Among the known genera of this subfamily the writer's material appears to have its nearest relatives among the members of the genus *Choanotaenia* Railliet, 1896; this is supported by the presence of a single crown of rostellar hooks, irregularly alternating genital atria, genital ducts passing between the excretory canals and dorsal of the nerve and the uterine capsules containing a single egg. Also the arrangement of the testes is very similar to that seen in *Choanototaenia cingulifera* (Krabbe, 1869) except that in this species testes are not present anterior of the coils of the vas deferens. The taenoid shape of the hooks would tend to ally the writer's species to those of the genus *Paricterotaenia*

Fuhrmann, 1932 (Dilepidinae Fuhrmann, 1907) because in *P. macracantha* Fuhrmann, 1908 hooks of the same shape are present and these are also arranged in a single circle, but the presence of uterine egg capsules and testes anterior of the female glands excludes the writer's species from this genus.

The shape of the rostellar hooks and the arrangement of the testes encircling the female glands and passing anterior of the coils of the vas deferens are characters which, as far as the writer could ascertain, have not been recorded for any known member of the genus *Choanotaenia* and the writer feels that these characters are of sufficient weight to merit the creation of a new genus—*Onderstepoortia*—for the reception of this species. This genus would be characterised as follows: *Dipylidiinae of medium size having a single crown of taenoid hooks; genital atria irregularly alternating; genital ducts pass between excretory canals and dorsal of nerve; testes encircle female glands and pass anterior of coils of vas deferens; uterus forms capsules each containing a single egg.* Type: *O. taeniaeformis* sp. n. from *Burhinops capensis capensis*, Onderstepoort, Transvaal.

Specific diagnosis.—Dipylidiinae reaching a length of 41 mm. having a rostellum carrying a single crown of 30 to 32 taenoid hooks 0·22 to 0·228 mm. long; cirrus sac crosses the excretory canal; testes 120-150 in number, rounded, practically fill the whole segment, ensircle the female glands and pass in front of the coils of the vas deferens; ovary slightly poral and crescentic; receptaculum seminis large; uterus breaks up to form egg capsules each containing a single egg; eggs thin shelled, 0·058 mm. in diameter.

Host: Burhinops capensis capensis, (Lcht.).

Location: Small intestine.

Locality: Onderstepoort, Transvaal.

Types in the Onderstepoort Helminthological Collection.

Fam: Hymenolepididae Fuhrmann, 1907

Sub-fam.: Hymenolepidinae Perrier, 1897.

Hymenolepis suricattae sp. nov.

This species is represented by several fragments originating from at least five worms as represented by their heads. The largest fragment, representing the posterior portion of the worm, is about 40 mm. long with a maximum thickness of 1·6 mm. at its posterior end. Judging from the state of development of the organs in the anterior segment of this fragment, and organs in the posterior segments of another fragment containing a head it is probable that an entire worm would reach about 70 mm. in length.

The head is top-shaped and has a maximum diameter across the posterior third of the suckers of 0·29 mm. The rostellum is well developed and is in all cases retracted into the scolex; it is from

0·2 to 0·212 mm. long with a maximum thickness of 0·093 to 0·102 mm. It carries a single row of rose-thorn shaped hooks (Fig. 12 a) which in the five heads numbered 15, 17, 15, 14, and 15 respectively. From the tip of the blade to the tip of the handle the

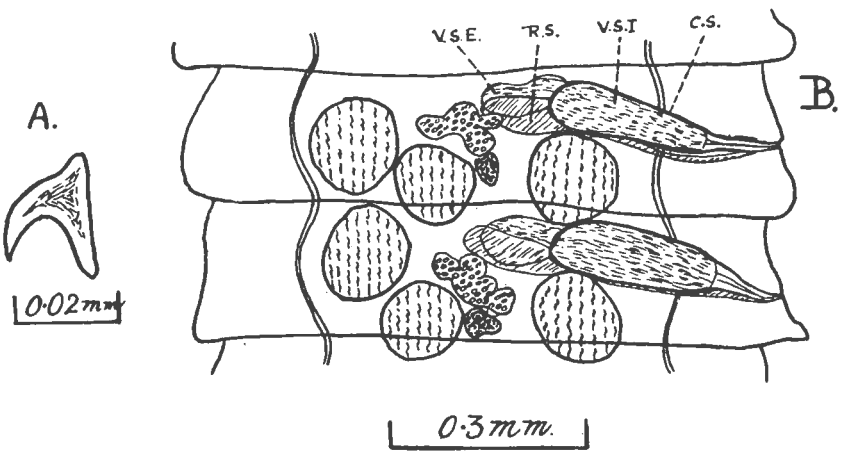


Fig. 12.—*Hymenolepis suricattae* sp. nov. Mature segment.
(C.S. = Cirrus Sac; R.S. = Receptaculum Seminis; V.S.E. = Vesicula Seminalis externa; V.S.I. = Vesicula Seminalis Interna.)

size varied from 0·021 to 0·023 mm. and from the tip of the handle to the tip of the guard 0·019 to 0·02 mm. The four suckers are oval about 0·17 mm. long by 0·14 mm. across. The neck varies considerably in length, being from 1·4 to 3·5 mm. long by 0·16 to 0·174 mm. broad. The segments, of which there are about 400 to each strobila, are all broader than long. Those towards the anterior end and just showing the beginnings of the developing genitalie are 0·326 mm. wide and 0·08 mm. long; mature segments measure 1·13 to 1·2 mm. broad by 0·162 to 0·17 mm. long and ripe segments are 1·35 mm. broad and 0·225 mm. long. The genital pores are all unilateral and situated mostly just behind the middle of the segment.

The ventral excretory canals are situated 0·29 to 0·30 mm. from the aporal and poral margins respectively in mature segments and have a diameter of 0·006 mm. The dorsal excretory vessels were not observed. The longitudinal muscles consist of the usual two layers of fibre bundles.

The three testes are arranged in a flat triangle (Fig. 12 B), two being aporal and one poral in position; the central testis lies immediately posterior of the ovary and the outermost aporal testes is situated slightly anterior and lateral of this medial testis; they are slightly oval organs measuring in their mature state 0·145 to 0·17 mm. by 0·11 to 0·13 mm. The cirrus sac is relatively thin walled and club shaped and extends over the excretory canals to terminate anterior of the poral testes; it is from 0·34 to 0·36 mm. long by 0·072 to 0·098 mm. broad in mature segments. The cirrus is small and inconspicuous and the greater portion of the cirrus sac is filled by the large vesicula seminalis interna which is from 0·19 to 0·22 mm. long by 0·072 to 0·095 mm. in diameter. A large and slightly twisted vesicula seminalis externa extends to the ovarian field.

The ovary is centrally placed and is transversely elongated and lobed; it is 0·23 to 0·255 mm. broad by 0·09 to 0·115 mm. long. The yolk gland lies immediately posterior of the ovary; it may be rounded, oval or slightly lobed and has a diameter of about 0·075 mm. The vagina opens ventral of the cirrus sac and is provided with a voluminous reseptaculum seminis which increases in size posteriorwards but diminishes in size again in those segments where the eggs are maturing. The uterus is a transverse and sacculated bag which in mature segments fills practically the whole segment, squeezing the excretory canals against the lateral margins. The eggs have three envelopes, the thin shelled egg embryophore measures 0·024 mm. and the embryo 0·022 mm. in diameter respectively, and the hexacanth hooks 0·0084 mm.

Affinities.—Except for one doubtful record by Gaiger (1915) of a *Hymenolepis* sp. from a dog, this is the first record of a member of this genus from a carnivore; the nature of the hooks, belonging to group IV of Fuhrmann (1906), their number and size easily distinguishes this species from the known mammalian species of this genus. The shape of the hooks is very similar to that found in *H. petrodromi* Baer, 1933, from an Insectivore, but in this latter species the hooks number only ten and are much smaller; besides its testes are arranged in a transverse row. Similar types of hooks are also found in *H. globirostris* Baer, 1925, from Rodents and *H. uncispinosa* Joyeux and Baer, 1930, also from Rodents; in the former species however the hooks are fewer in number (12-14) and smaller (0·018 mm.) and in the latter fewer in number (12) and much larger (0·034 mm.).

Specific diagnosis.—Hymenolepidinae of medium size which may reach 70 mm. in length; head small and cone-shaped; suckers oval, hooks 14-17 in a single row, rose-thorn shaped and 0·021 to 0·023 mm. long from tip of blade to tip of handle; two aporal and one poral testes, arranged in a flat triangle; vesicula seminalis interna and externa large; cirrus sac crosses excretory canal and reaches poral testes; ovary central and lobed; uterus sacculated and fills practically whole segment in ripe segments. Eggs thin shelled.

Host: *Suricata suricatta suricatta* Erxl.

Location: Small intestine.

Locality: Fauresmith, Orange Free State.

Types in the Onderstepoort Helminthological Collection.

Fam. Taeniidae Ludwig, 1886.

Cladotaenia freani sp. nov.

The specimens of this species were submitted to this institute for determination by Mr. J. R. Frean, Government Veterinary Officer, at Potchefstroom, Transvaal. He obtained them from a Black Eagle

Hawk, shot at Victoria West, Cape Province. The material consisted of four strobilae with ripe segments but no scolices and three fragments with scolices; two of the latter still retained most of their hooks.

The four strobilae measured respectively 77, 98, 102, 107 mm. with a marimum thickness at about their maddle of 2·5 mm. The worms are considerably shrunken, so that when extended the length will be considerably more. The segments are at first broader than long; as the segments grow older they tend to become longer so that in segments where the sexual glands are disappearing they are more or less square; in older segments they become narrower and longer so that ripe segments may reach a length of 3·4 mm. by 1·3 mm. broad.

The scolex is dorso-ventrally flattened and has a transverse diameter of 0·3 mm. by 0·2 mm. thick (Fig. 13 A & B). The rostellum is prominent and 0·25 mm. broad by 0·16 mm. thick; it carries a double circlet of hooks; although all the hooks are not present it is possible to determine that there were 42 on the one scolex and 50 on the other. The anterior longer hooks are 0·031 to 0·035 mm. long from the tip of the blade to the end of the handle;

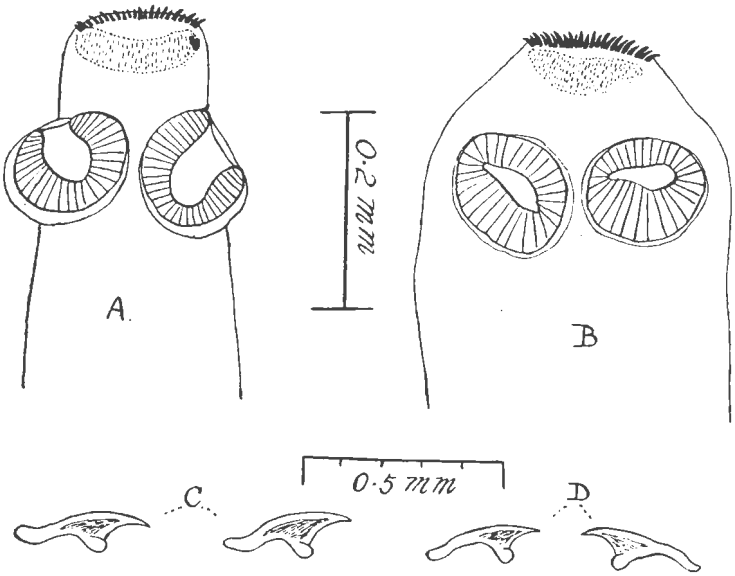


Fig. 13.—*Cladotaenia freani* sp. nov. Scolex and hooks. (A = lateral view of scolex; B = ventral view of scolex; C = anterior large hooks; D = posterior smaller hooks.)

the smaller are 0·024 to 0·028 mm. long between the same points (Fig. 13 C and D). In both the blade and handle are more or less on the same axis, and in the longer hooks the end of the handle is bent upwards and in the smaller hooks it is bent downwards. The four suckers are somewhat oval being 0·13 mm. long by 0·107 mm. across; in lateral view of the scolex they stand out prominently from the scolex itself. There is a short neck, about 0·46 mm. long by 0·27 mm. broad; the first segment is only about 0·035 mm. long

by about 0·23 mm. broad. The excretory system consists of two pairs of longitudinal canals; the ventral canals are situated about 0·35 mm. from the edge of the segment and have a diameter of 0·04 to 0·09 mm. and are joined together by a transverse canal at the posterior end of each segment. The dorsal excretory canals are very small and have a diameter of only about 0·003 mm.; they are thick walled and are situated dorso-laterally of the ventral canals on their inner side. The genital canals pass between the excretory canals and ventral of the nerve cord.

The nerve cords lie lateral of the excretory canals and about 0·29 mm. from the edge of the segment.

The longitudinal muscles are well developed and form a single sheet about 0·055 mm. thick; it consists of numerous irregularly scattered muscle bundles, each bundle composed of from two to 40 fibres, about 0·003 to 0·004 mm. thick; the circular muscles are represented by a thin sheet just internal of the longitudinal muscles and separating the cortical from the medullary parenchyma. Transverse and dorso-ventral muscles appear to be very poorly developed. The subcuticular parenchyma carries numerous chalk bodies about 0·007 mm. in diameter.

The genital atria alternate irregularly and are situated in the anterior half of the segment, at about the junction of the second and third sevenths of the segment in mature segments. A deep genital atrium about 0·06 mm. deep joins the genital pore to the openings of the genital canals (Fig. 14). The cirrus sac is pyriform, muscular,

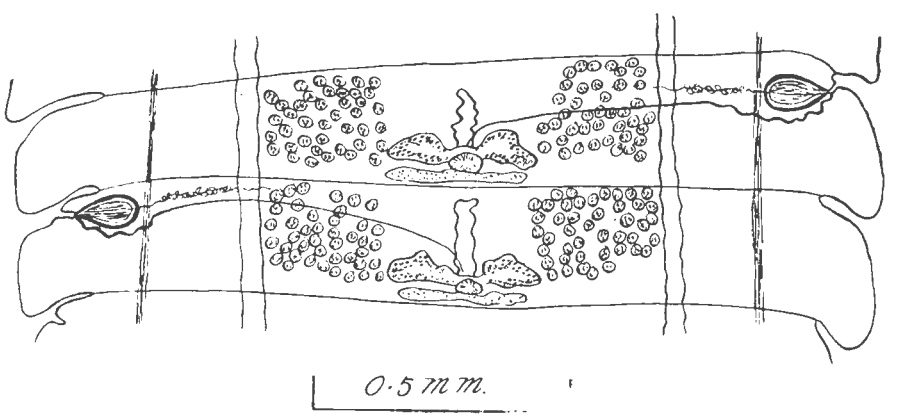


Fig. 14.—*Cladotaenia freani* sp. nov. Mature segment.

about 0·13 mm. long with a maximum diameter of 0·07 mm. There are about 80 to 100 testes but in the contracted segments they are so closely packed that it was not possible to determine their number with certainty; they are arranged in two longitudinal fields bounded externally by the ventral excretory canals and internally by the field occupied by the female glands; they extend posteriorly at the sides of the ovary to the level of the yolk glands but do not pass inwards behind these glands; no testes are present in the field immediately anterior of the ovary; they form one or two layers, generally only one. The ovary consists of two lobed wings situated

in the posterior and ventral portion of the segment; it is rather small, being in mature segments at most 0·38 mm. broad; the yolk gland is situated immediately behind and in the same plane as the ovary and is almost as wide as the ovary. The shell gland is rounded, situated behind the ovary but dorsal of the yolk gland. The vagina opens into the genital sinus on the same level but behind the orifice of the cirrus sac; it passes inwards forming a number of small convolutions and then forms an arch which passes into the shell gland in the middle of the isthmus joining the two ovarian wings; at its distal end it is widened to form a small reseptaculum seminis. The uterus (Fig. 15) consists of a medium stem with about 10 to 14

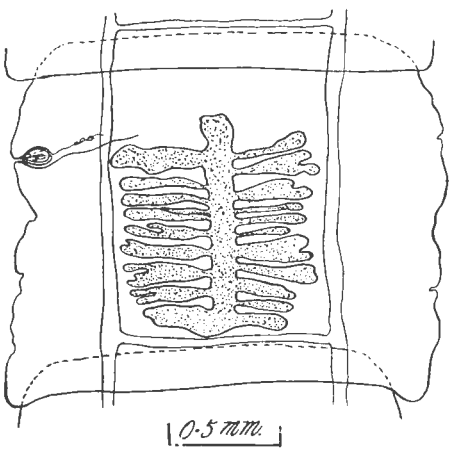


Fig. 15.—*Cladotaenia freani* sp. nov. Ripe segment showing uterus.

lateral branches. The median stem generally does not reach the anterior border, but segments where it does extend through the segment are not uncommon. The numerous eggs are slightly oval and smooth shelled, the shell being only 0·0015 mm. thick; the egg (embryophore) is 0·035 to 0·036 mm. long by 0·032 mm. across, the contained embryo has a diameter of 0·02 to 0·021 mm. of the hexacanth hooks are 0·007 mm. long.

Affinities.—Up to the present four species of Taeniidae have been described from birds of prey (Accipitres) namely *Cladotaenia armigera* (Volz, 1900), *Cladotaenia cylindracea* (Bloch, 1782), *Taenia heteracantha* Fuhrmann, 1906, and *Taenia s.l. hassalli* Fuhrmann, 1932. A description of the lastnamed is unfortunately not available to the writer so that it cannot be compared with the writer's species. *Taenia heteracantha* is characterised by having large hooks measuring 0·2 and 0·14 mm. long for the large and small hooks respectively. *Cladotaenia cylindracea* is very similar to the writer's species in that testes do not encroach into the ovarian field anterior to the ovary, but differs from it in that its testes pass posteriorly and meet behind the yolk glands, and because the median stem of the uterus in the writer's species may reach the anterior border of the segment. *C. armigera* differs in that its testes meet behind the female glands.

Specific diagnosis.—Taeniidae of small size, attaining a length of 10·7 cm. with a maximum breadth of 2·5 mm. Scolex small, rostellum with double crown of 42 to 50 small hooks, 0·031 to 0·035 mm. long for the larger and 0·024 to 0·028 mm. long for the smaller. Genital pores irregularly alternate at about the junction of 2nd and 3rd seventh of segment. About 80 to 100 testes in two longitudinal fields lateral of ovarian fields; no testes in fields anterior of ovaries; they do not extend backwards beyond anterior level of yolk glands. Ovaries relatively small and confined to area between testicular field. Uterus a median stem with 10-14 lateral branches; median stem generally does not extend to anterior border of segment, although it may occasionally do so. Eggs numerous; embryophore oval and and smooth shelled measuring 0·035 to 0·036 by 0·031 to 0·032 mm.

Host: Black Eagle Hawk. [? *Pteroaetus verreauxi* (Less).]

Location: Small intestine.

Locality: Victoria West, Cape Province.

Types in Onderstepoort Helminthological Collection.

Cladotaenia vulturi sp. nov.

Four fragments of this interesting parasite were available which, from the state of development of the internal organs, would appear to present portions of the same worm. In the oldest segments available the genital glands have just disappeared, so that if only one worm is represented then it must attain a length considerably longer than the total length of the fragments which total 80 mm., with a maximum breadth of 1·9 mm. The longest fragment is 38 mm. long and is provided with a scolex which unfortunately has a portion of its anterior face snipped off, so that the nature of the rostellum remains unknown. One small taenoid hook (?posterior), measuring 0·026 mm. in length, was adhering to the scolex, so that it appears legitimate to assume that the rostellum was armed. Unfortunately during the course of mounting the single hook was lost before a drawing of it was made. The remains of the scolex measure 0·4 mm. across and the somewhat circular suckers have a diameter of 0·2 mm. The neck is somehat contracted and is 0·5 mm. long.

From the toto-mount two large lateral ventral excretory vessels can be made out; in mature segments they have a diameter of 0·09 mm. and are united to each other by a large transverse duct at the posterior end of each segment; they were situated 0·26 to 0·29 mm. from the edge in mature segments.

The genital pores alternate irregularly and are situated in the anterior quarter of the segment at about the junction of the 1st and 2nd fifths; they are not raised on a genital papilla and they lead into a cup-shaped genital atrium about 0·05 mm. deep by 0·03 mm. across. The muscular cirrus sac is pyriform, 0·13 to 0·15 mm. long and 0·08 mm. maximum diameter; it does not reach the ventral excretory canal (Fig. 16 A & B). The vas deferens after crossing the excretory canal becomes intricately coiled and extends straight

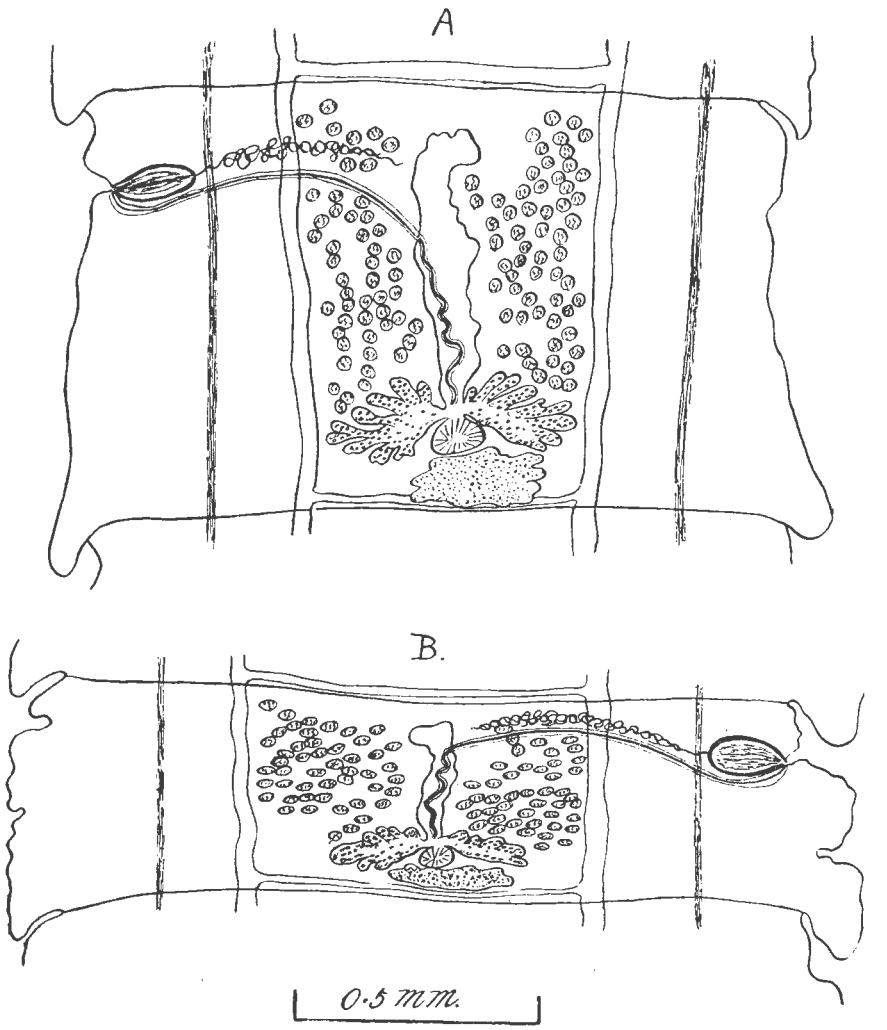


Fig. 16.—*Cladotaenia vulturi* sp. nov. Mature segments. (A = extended segments; B = contracted segment.)

inwards almost to the midline of the segment. The testes, of which there are from 80 to 110, are all situated anterior of the ovary, none being present on the lateral or posterior sides of this organ; in extended segments (Fig. 16, A) they ar confined to the field limited by the width of the ovaries, the central or uterine area being devoid of testes; as in these extended segments the ventral excretory canals just skirt the lateral limits of the ovaries and as the testes do not extend lateral of these canals it will be seen that the testes become confined only to the field anterior of the ovaries. In segments, however, which are contracted (Fig. 16 B) the excretory canals are pushed outwards and the same applies to the testes; in these segments testes are present in the areas lateral of the ovarian fields, but no testes are found lateral or posterior of the ovaries themselves. This distribution of the testes is a characteristic which is constant in all the segments and easily distinguishes this species from the preceeding species.

The vagina opens into the genital atrium just behind the cirrus sac; it forms a gentle curve round the cirrus sac and then extends inwards somewhat parellel to the course occupied by the vas deferens; on reaching the midline it bends backwards and after being thrown into a few prominently staining loops it disappears in the isthmus of the ovaries after having formed a small reseptaculum seminis. The two-winged ovaries are large and multilobed and are about 0·44 mm. wide by 0·12 mm. long; the yolk gland is situated behind the ovary and is about 0·29 mm. broad by 0·085 mm. long; a small rounded to oval shell gland measuring 0·04 to 0·06 mm. across is intercalated between the ovaries and shell gland. The median stem of the uterus extends forwards to the level of the genital pore or almost to the anterior edge of the segment. No fully developed uteri are present, but from the partially developed uteri it would appear that there are about ten lateral branches on either side of the median stem.

Affinities: The small size of the hooks distinguished this species from *Taenia heteracantha* Fuhrmann (1906) and the distribution of the testes distinguishes it from the species described above and from the species *Cladotaenia armigera* (Volz, 1900) and *C. cylindracea* (Bloch, 1782).

Specific diagnosis.—Taeniidae of small size provided with a small scolex and small rostellar hooks, genital atria irregularly alternate and in anterior fifth of segment. Testes number 80 to 110, all confined to area anterior of ovaries and do not cross the excretory canals; central uterine area of segment devoid of testes. Vagina passes down centre of segment and forms few prominent coils; ovaries multilobed and large. Uterus with apparently about 10 lateral branches on either side.

Host: " Vulture ".

Lication: Small intestine.

Locality: Kruger National Park, Transvaal.

Type slide in Onderstepoort Helminthological Collection.

Since submitting this paper to the press the writer has seen a paper by Yamaguti (" Studies on the Helminth Fauna of Japan. Part 6. Cestodes of Birds I." *Jap. Jl. of Zool.* Vol. 6, pp. 183-232. Tokio, 1935) wherein a new species—*Cladotaena circi*—is described from *Circus aeruginosus aeruginosus* (L.). In addition a new genus—*Paracladotaenia*—is created for the reception of *P. accipitris* sp. nov. from *Accipiter virgatus gularis* (Temm. and Schl.). The former species differs from *C. freani* sp. nov., described above, in having smaller hooks (0·018 and 0·024 mm.) and in that the testes meet behind the female glands. This latter character also distinguishes Yamaguti's species from *C. vulturi* sp. nov. The genus *Paracladotaenia* differs principally from the genus *Cladotaenia* in that the testes are arranged in two separate groups and not united behind the female glands; the uterus extends through the length of the segment; a vesicula seminalis interna is present, and rostellar hooks are absent. The species *C. freani* sp. nov. and *C. vulturi* sp. nov, resemble *P. accipitris* in having two lateral groups of testes and the uterus in

some cases extends through the length of the segment. Should additional material of Yamaguti's species become available for examination and this material showed that rostellar hooks are normally present in this species and had been lost in the type material, then the writer would have no hesitation in assigning his two species to the genus *Paracladotaenia* rather than to the genus *Cladotaenia*.

In the above paper Yamaguti also refers to two species of *Cladotaenia* (*C. feuta* and *C faria*) described by Meggitt (1933), whose descriptions the writer has not been able to consult. The former species has no rostellar hooks and has less than 100 testes; the latter species has 20 rostellar hooks, 0·006 to 0·007 mm. long, and also has about 100 testes. As Yamaguti compares these two species with his species *Cladotaenia circi*, the writer infers that in Meggitt's species the testes are not arranged in two separate groups.

Summary.

The writer here describes eight new species of cestodes, three from mammals and five from birds; the mammalian species are *Inermicapsifer leporis* sp. n. from a hare, *Catenotaenia geosciuri* sp. n. from a suricat. The avian species are *Raillietina* (*Skrjabinia*) *deweti* sp. n. from a guinea fowl, *Schistometra korhaani* sp. n. from a bustard, *Onderstepoortia taeniaeformis* gen. and sp. n. from a stone curlew, *Cladotaenia freani* sp. n. and *Cladotaenia vulturi* from birds of prey.

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